A10
CANTOR FITZ
E-1

ELECTRICAL SPECIFICATIONS

CODES AND STANDARDS
The electrical installation shall comply with the following codes and standards:
1. Underwriter's Laboratories Inc.- U.L.
2. National Electrical Code of the NFPA - NEC
3. New York N.Y. Electric Code
4. Occupational Safety and Health Act- OSHA
5. Americans with Disabilities Act - A.D.A.

SHOP DRAWINGS AND CATALOG CUTS
The Contractor shall prepare and submit to the Engineer for approval, detailed shop drawings, catalog cuts and wiring diagrams in accordance with the requirements of the clause entitled "Working drawings and Catalog Cuts and Brochures".

SUBSTITUTIONS
Any substitution to the electrical items described on this contract will only be permitted upon written approval of the Engineer.

QUALITY ASSURANCE
The Contractor shall have had experience on at least two projects involving quantities and complexities at least equal to those required under the electrical portion of this contract. All workmen shall be skilled in the trade involved.

INSPECTION
All aspects of the installation shall be inspected for compliance with the requirements of the contract drawings and specifications. Replace any portion of the construction that does not meet such requirements, to the satisfaction of the Engineer.

CUTTING AND PATCHING
1. All cutting and patching required for equipment included in these specifications shall be done by this Contractor. If cutting is done due to failure to perform preliminary roughing work, this Contractor will be responsible for the cost of the additional patching.
2. In [illegible] floors, walls, or partitions are required to be [illegible] furnish and locate all required sleeves and inserts [illegible] constructions are constructed. Where sleeves and inserts are [illegible] incorrectly located, the Contractor shall be responsible for any required cutting and patching.
3. All finishes [illegible] or adjoining occupied tenant spaces or public spaces shall be approved by the Engineer.
4. The [illegible] shall not do any cutting that may impair the strength of the building construction. [illegible] except for small screws, may be drilled in beams or other structural members without obtaining prior approval. All work shall be done in a neat [illegible] by mechanics skilled in their trades and as approved.

DISSIMILAR METALS
1. Dissimilar metals as used herein shall be those which are incompatible in the presence of moisture, as determined from their position in the electrochemical series of the test data. Where dissimilar metals come in contact, paint the joint both [illegible] and out with approved paint so as to exclude moisture from the joint, or provide a suitable barrier separating the metals.
2. Transition in conduit from one metal to a dissimilar metal shall only be made at boxes or other enclosures, except where otherwise specified herein or shown on the contract drawings.

RACEWAYS AND BOXES
1. Where sizes of raceway or boxes are not indicated, the contractor shall contact the Engineer for additional details and specifications.
2. Flexible metal conduit shall be used for final connection of lighting fixture and wiring devices to be installed in hung ceilings or in removable hollow metal partitions construction. When designated by engineer on final approved tenant drawings flexible metal conduit shall be used for final connection of lighting fixture and wiring devices to be installed in movable walls and movable partitions. Flexible metal conduit shall be used in such designated movable walls and movable partitions at no additional cost.
3. All conduit or tubing shall be cut square and reamed at the ends. Red lead [illegible] to all exposed threads after joints have been made up.
4. [illegible] shall be mechanically and electrically continuous from service starting to all outlets. Conduit shall enter and be securely connected to cabinet, junction box, pull box or outlet box by means of locknuts on the outside and inside and an insulated bushing on the inside. In tubing or flexible metal conduit, the one compression locknut shall be made wrench tight. All locknuts shall be the bonding type with sharp edges for digging into the metal wall of the enclosure and shall be installed in a manner that will assure a locking and electrically continuous installation. Locknuts and bushings will not be required where conduits are screwed into tapped connections.
5. All vertical runs of conduit or tubing terminating in the bottoms of wall boxes or cabinets or similar locations shall be protected from the entrance of foreign material prior to the installation of conductors.
6. Unless otherwise specified, all conduit and tubing shall be installed concealed. In general, all conduit and tubing shall be run in hung ceilings and furred spaces where they exist. Where conduit is run exposed it shall be securely supported with zinc coated malleable iron pipe straps or other approved metals.
7. Every conduit system shall be installed complete before any conductors are drawn in. Wire pulling lubricants, when utilized, shall be in accordance with the requirements of Underwriters Laboratories Inc. applicable to the specific conductor or cable insulation and raceway material.
8. Where required and approved by the Engineer, extra deep or extra shallow outlet boxes shall be used to facilitate the installation of the conduit system.

OUTLET DEVICES
1. All device plates for wall outlets (Power and Telephone) shall be brushed satin finish anodized aluminum. Device plates for telephone outlets shall contain a finished hole.
2. All convenience type receptacles shall be of the grounding type.

GROUNDING
1. Metal raceways, metallic enclosures of electrical devices and equipment, lighting standards and other equipment shall be completely grounded in an approved manner.
2. Ground wire required for complete grounding system shall be installed by the contractor.

FASTENERS
Provide [illegible] expansion shield lugs, anchors, bolts with nuts and washers, shims or any other type of fastening devices required to fasten panels or other equipment to the building floors, walls or ceiling. Unless otherwise specified herein or shown on the contract drawings, all fasteners shall be hot dipped galvanized and of sizes and types recommended by the equipment manufacturer and as approved by the Engineer.

WIRES
1. Unless otherwise specified or specifically indicated on the drawings, all conductors for lighting and power shall be tinned single conductor annealed copper with type XHHW-VW-1 (low smoke, low toxicity) insulation, 600 volt and a minimum of 98 percent conductivity (U.L. Standard #44).
2. In lieu of a separate green grounding wire and grounding bushings, flexible metallic raceway for connection of lighting fixtures may be utilized as the grounding conductor if a locking type construction shakeproof connector especially designed to insure positive grounding is provided. A separate ground conductor shall be required whenever the grounding path through flexible metal conduits is longer then six feet, and/or the enclosed wire are protected by over current devices rated above 20 amperes.

Color coding
The Contractor shall match the color coding that is being used in the building, any deviation due to limited quantities of cable may be permitted upon written approval of the Engineer.

	System Voltage	
	120/208V	277/480V
	3 Phase	
Black	A	Brown
Red	B	Orange
Blue	C	Yellow
White	Neutral	Gray
Green	Ground	Green

Connections
The wiring for lighting receptacles including outlets for miscellaneous devices and for electric power including all 120/208v connections to the cellular floor systems shown on the drawings, shall be furnished and installed complete from point of service connection to all outlets indicated on drawings.

CABLE SPLICING
1. No splices or joints will be permitted in either feeders or branches except at outlets or accessible terminals, splices or junction boxes.
2. All material required for making splices and/or terminations shall be supplied in complete kits. For [illegible] months, the Contractor shall also be responsible to insure that all materials furnished will not adversely effect the physical or electrical properties of any [illegible] of the wire or cable itself. Kits shall be manufactured by Minnesota Mining and Manufacturing, N.Y. or approved equal.
3. Where the Contractor makes connections to existing wires, he shall open and disconnect the existing splices from such wires and install new splices to include the existing as indicated.
4. All splices for wire sizes # 10 and smaller shall be made with insulated spring connectors applied to twisted conductors. Two half lapped layers of vinyl tape extending a distance of not less than one inch from the connector shall be applied. Splices other than the aforementioned, will be permitted at the discretion of the Engineer.

LIGHTING FIXTURE HOOKUP WIRE
1. Splice shall not be permitted in any run of fixture hookup wire.
2. Connections to branch circuit conductors and to existing fixture wiring shall be made and installed spring connectors or crimp type connectors.

IDENTIFICATION OF WIRES
1. All wires shall be identified by circuits in all cabinets, boxes, wiring troughs and other enclosures, and at all terminal points, receptacles, etc.
2. The circuit designations shall be as shown on the contract drawings or as directed by the Engineer. Tags shall be attached to wires so that they will be readily visible.
3. Brady B-500 vinyl cloth wire and terminal markers shall be used for all wire identification.

LIGHTING FIXTURES
General
1. This clause of the Specification covers the furnishing of labor, materials, equipment and the installation of all indoor and outdoor lighting fixtures, lighting equipment and the installation of lamps for all the electrical outlets in the building including the connection of fixtures and equipment to the electric wiring system as shown on plans. As specified hereinafter certain fixtures shall be furnished by this Contractor while others will be furnished by the Authority for storage, installation and connection by this Contractor.
2. The Contractor is directed to review the applicable Architectural and Electrical drawings for details on fixture construction and installation media for fixtures to be furnished by the Authority. The drawings represent a concept, not a final design and reasonable changes to design may be made by the Authority.
3. All luminaires and lighting equipment shall be delivered to the premises complete including all mounting accessories and components necessary for the proper operation of the equipment, exclusive of lamps, whether furnished by the Contractor or by the Authority.
4. All fixtures and components shall be made in accordance with the National Electrical Code, all local codes applying and shall conform to all applicable requirements of the Underwriters Laboratories, Inc.
5. All recessed fixtures furnished by the Authority will be furnished with fixture wiring only. The Contractor shall provide wiring extensions in flexible conduit and necessary fittings to complete the wiring system connections.

Lamps
Lamps shall be those manufactured by General Electric, Westinghouse or Sylvania. All fluorescent lamps shall be warm white watt miser where applicable. Incandescent lamps shall be rated at 125 volts except where otherwise noted. The Contractor shall install new lamps in all new fixtures and fixtures that are supplied by the Authority. The Authority can supply fluorescent lamps for base building type fixtures only. All other lamps shall be furnished by the Contractor. "Supplied by" shall mean "may be purchased from".
Prior to acceptance and final payment, all lamps which are missing, burnt-out or broken shall be furnished or replaced by the Contractor.

Installation and locating of fixtures
Fixture locations as indicated on the electrical drawings are generalize and approximate. The Contractor shall carefully verify fixture locations with Architectural plans, reflected ceiling plans and other reference data prior to installation.

Wiring
1. Wiring between fluorescent lampholders and associated operating and starting equipment shall be of the same or heavier gauge than the leads furnished with the approved types of ballasts and shall have equal or better insulating and heat-resisting characteristics. All other wiring within fluorescent lighting fixtures or from the fixture to the splice with the building wiring shall conform to the requirements of the latest published issue of the National Electrical Code.
2. Unless otherwise specified or shown on drawings, all wiring [illegible] incandescent fixtures shall conform to the requirements of the National Electrical Code and shall be not less than No. 16 G[illegible] protected with tape or tubing at all points where abrasion is [illegible] shall be concealed within fixture construction except where mounting dictates otherwise.
3. Connections of fixture terminals of lampholders and other [illegible] made in a workmanlike manner and shall be electrically [illegible] mechanically secure with no loose strands protruding. The [illegible] extending to or from the terminals of a lampholder or other [illegible] exceed the number of which the accessory is designed to a[illegible]
4. Joints in wiring within lighting fixtures and connections of the [illegible] wiring of the building shall be made so that they will be mechanically secure and then soldered and taped to provide [illegible] that of the conductors being joined in lieu of solder and to [illegible] adequately insulated solderless pressure crimped type co[illegible] furnished, provided sizes used, method of application and [illegible] accordance with the connector manufacturers recommen[illegible]
5. Wiring channels and wireways shall be free from projection[illegible] edges throughout and all points or edges over which cond[illegible] may be subject to injury or wear shall be rounded or bushe[illegible] shall be installed at all points of entrance or exit of flexible w[illegible]

Fluorescent Lamp Ballasts
1. Ballasts shall provide and assure safe and reliable operati[illegible] fluorescent lamp(s) specified for each fixture type. Ballasts [illegible] factor type, rated class "P", series or maxi miser where app[illegible] operation of Rapid Start Lamps.
2. The ballast shall be protected by a minimum of a one yea[illegible] from the date of acceptance of the installed fixtures, again[illegible] workmanship and material which includes an in-warranty se[illegible] providing for the payment of authorized labor charges incu[illegible] replacement of inoperative in-warranty ballasts.
3. All ballasts shall be U.L. listed Class "P".

Supports
1. Recessed fixtures shall be furnished complete with mount[illegible] accessories. Where necessary to meet code requirements [illegible] shall be suitable for a 1 hour fire rating or concrete pour requ[illegible] devices including brackets, plaster rings, saddle hangers, a[illegible] made of formed or rolled metal shapes with the requisite ri[illegible] maintain continuous alignment of the installed fixtures.
2. Fixtures shall be attached to ceiling supporting members [illegible] on lathing or plaster for alignment or support. Fixtures in susp[illegible] supported by saddle hangers or tie bars attached to runne[illegible] crossbars of ceiling systems. Mounting splines or other positi[illegible] maintaining alignment and rigidity shall be provided. Supp[illegible] surface passivated, and shall be primed or paint dipped to [illegible] fastening devices shall be of a positive, locking type, and s[illegible] of special tools to apply or to remove. Tie wires shall not be [illegible] fastening devices.

FINAL CLEANUP AND FIELD TESTS
After completion of the entire electrical installation
1. The Contractor before final acceptance will be granted [illegible] fixtures, glassware, panelboards, cabinets, device plates, [illegible] items furnished under this contract, and shall insure that all [illegible] with completed or revised schedules and all identification [illegible] equipment, cables, and other items, are completed.
2. The Contractor shall repair or replace, as directed by the [illegible] additional cost to the owner, any item damaged due to [illegible] reinstallation.
3. In addition to any tests that may be required in the vario[illegible] perform field tests in the presence of the Engineer, to dem[illegible] the electrical installation. Give the Engineer 48 hours advan[illegible] The following field tests shall be performed by the Contrac[illegible]
a. Operate all electrical equipment for a period of 24 hour[illegible] directed by the Engineer.
b. Test all wires and cables installed under this contract with [illegible] Furnish the Engineer a copy of the results together with an [illegible] used. If in the opinion of the Engineer, any readings are lo[illegible] good practice or applicable codes promptly replace th[illegible] materials involved.
c. Should the foregoing tests reveal any defects, promptly [illegible] re-run such tests until the entire installation is satisfactory in a[illegible]

POWER INTERRUPTION NOTE
Electrical power must be shut off prior to the Contractor pe[illegible] raceways with live electrical circuits or on any other live ele[illegible] equipment. Power interruption will be permitted only betw[illegible] and 8 A.M. The actual dates, time and duration of all powe[illegible] subject to prior approval of the Engineer.

CORE DRILLING
Core drilling will be permitted only between the hours of 6 P[illegible] Cored holes shall be a minimum of 16 inches center to cen[illegible] and/or existing cored holes, including those abandoned [illegible] Cores shall be of (4") maximum diameter.